

Comparison of Post-Surgical Complication of Urethrocutaneous Fistula for Distal Hypospadias Repair between Snodgrass and Aivar Bracka Surgical Techniques

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ABSTRACT

OBJECTIVE: Comparison of the frequency of post-surgical complication of urethrocutaneous fistula for distal penile hypospadias between Snodgrass and Aivar Bracka surgical techniques.

Methods: Burn and trauma center, HMC was the place for study. The duration of study was one year, from 01/01/2020 to 31/12/2020. The study design was Randomized Controlled Trial, in which a total of 70 (35 in each group) patients were selected. The patients were divided randomly in group A and B using envelope sampling technique. Group A were assigned to Snodgrass repair technique and group B were assigned to Aivar Bracka, repair technique. Consultant plastic surgeons performed all the procedures. Both groups were followed for six months for development of urethrocutaneous fistula. Results were stratified for each procedure. Results presented in the form of tables.

RESULTS: In this study for Snodgrass hypospadias repair procedure, the mean age was 6 years \pm 3.26 while for Aivar Bracka surgical procedure the mean age was 6 years \pm 3.41. the frequency of urethrocutaneous fistula was 9% (n=3) in Snodgrass surgical technique, where as 18% (n=6) in Aivar Bracka Surgical Technique. The frequency of urethrocutaneous fistula was significantly low in group A (p=0.2840).

CONCLUSION: Our study concludes that Snodgrass surgical technique has less frequency of developing urethrocutaneous fistula than Aivar Bracka surgical technique for correction of distal penile hypospadias.

KEY WORDS: hypospadias, fistula, complications.

INTRODUCTION

Hypospadias is a birth deformity. It occurs because of the failure of fusion of urethral folds in the intra uterine life, as a result the external urethral meatus opens abnormally on the ventral surface of the phallus. It is the most common birth anomaly of male external genitalia. The prevalence of which is 1 in 200-300, live births (1, 2).

The causes of hypospadias are not yet established but it is hypothesized that exposure of fetus to certain chemicals having anti-androgen or estrogen like activity, that may interfere with normal hormonal signaling, like "dioxins and furans, polychlorinated biphenyls, organochlorine pesticides, phthalate esters, brominated flame-retardants and some heavy metals" (3).

Hypospadias can be classified according to the location of external urethral meatus in the following types "glanular, subcoronal, distal penile, proximal penile and penoscrotal". It can be associated with other congenital abnormalities, such as "undescended testes, renal abnormalities and inguinal hernia". Because of associated abnormalities physical examination is mandatory, to rule out the presence of other congenital diseases (4). Surgery is the only treatment modality for hypospadias repair. Hypospadias surgery dates back to 100-200 BC, "Heliiodorus and Antyllus" were treating hypospadias by amputating the phallus distal to meatal

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opening."Mattauer" started the era of new surgical techniques in 1842, in "1874" Duplay introduced the concept of urethra reconstruction," Lauenstien in 1892 "introduced the flaps in urethral reconstruction. Currently there has been more than 200 hypospadias repair procedures described by different plastic surgeons, urologists and pediatric surgeons, which reflect the unsatisfactory results associated with these procedures.

Aivar Bracka (AB) surgical technique is Two stage procedure, which can treat all types of hypospadias, with any degree of chordee. It has gained much of the popularity in modern era. In first stage the urethral plate is incised, chordee is corrected, the fibrous scared tissue is excised up to the corpora and full thickness skin graft is taken from non-hair bearing area such as "prepuce, oral mucosa, post auricular area, medial arm", which is applied over the urethral plate and a tie over dressing is applied over the graft. After 6 months of Stage one if the graft is soft and supple Stage two is performed, in which urethroplasty is performed. The urethra is constructed over a silicone catheter with absorbable suture. The catheter is removed after one week.

Snodgrass surgical technique, also called Tubularized Incised Plate (TIP), popularized in 1994, is a single stage technique, in which the urethroplasty is done over a catheter by incising the urethral plate and a dorsal slit is given in the urethral plate which is left for secondary healing (5).

The most common complications of hypospadias correction surgery are "urethrocutaneous fistula, meatal stenosis, wound dehiscence, recurrent chordee and hematoma". Urethrocutaneous fistula is one of the most common complication of any type of surgical techniques, which is corrected by another surgery.

The incidence of urethrocutaneous fistula which is reported in literature is 28% (6) in Aivar Bracka technique and 5.76% (7) in Snodgrass technique in different series. There is no comparative study on the same study population. The aim of study is the Comparison of the frequency of post-surgical complication of urethrocutaneous fistula for distal penile hypospadias between Snodgrass and Aivar Bracka surgical techniques. The rationale of study is that if the occurrence of fistula after Snodgrass surgery is less or comparable to Aivar Bracka surgery, then Snodgrass surgical procedure is better for the patients regarding "single stage, less financial burden, less hospital stay, less psychological trauma, and early recovery".

MATERIALS AND METHODS

The study "Randomized Controlled Trial "was performed in Burns and Trauma center, HMC Peshawar from 01/01/2020 to 31/12/2020. We have included a total of 70 patients in this study. Inclusion criteria was" all patients, from 2 to 10 years of age, with distal penile hypospadias, without chordee, and with wide urethral plate". Exclusion criteria was "Previously operated cases, patients with diabetes mellitus, other comorbid conditions and congenital anomalies" were excluded from the study population. The sample size was 70 (35 in each group) using 95% confidence level, frequency of 5.76% (7) and 28%⁹ of urethrocutaneous fistula after hypospadias repair with 80% power of test, under WHO formula for sample size calculation.

After approval from the medical ethics committee, all the patients after admitting from the outpatient department according to the inclusion criteria were divided into two groups. The patients were divided randomly in group A and B using envelope sampling technique. Group A were assigned to Snodgrass repair technique and group B were assigned to Aivar Bracka, repair technique. Consultant plastic surgeons performed all the procedures. After detailed history and examination, informed consent was taken from the patients about the Study. The procedures were performed, in Snodgrass surgical technique, also called Tubularized Incised Plate (TIP), popularized in 1994, is a single stage technique, in which the urethroplasty is done over a catheter by incising the urethral plate and a dorsal slit is given in the urethral plate which is left for secondary healing (4) .In Aivar Bracka (AB) surgical technique is Two stage procedure, which can treat all types of hypospadias, with any degree of chordee. It has gained much of the popularity in modern era. In first stage the urethral plate is incised, chordee is corrected, the fibrous scared tissue is excised up to the corpora and full thickness skin graft is taken from non-hair bearing area such as "prepuce, oral mucosa, post auricular area, medial arm", which is applied over the urethral plate and a tie over dressing is applied over the graft. After 6 months of Stage one if the graft is soft and supple Stage two is performed in which urethroplasty is performed. The urethra is constructed over a silicone catheter with absorbable suture. The catheter is removed after one week

The patients were followed post operatively for occurrence of urethrocutaneous fistula after "one week, two weeks and four weeks".

All the details were documented in a specialized proforma made by statistician. we followed the Exclusion criteria strictly to remove the confounders and bias. The data collected of our study was organized and analyzed with the statistical package for social sciences (SPSS 17). Frequencies and percentages were computed to present categorical variable i.e. urethrocutaneous fistula. Continuous (quantitative) variable like age and duration of surgery was presented in the form of mean \pm SD. Effect modifiers like age and duration of surgery was controlled through stratification. Post stratification Chi Square test was used to compare frequency of urethrocutaneous fistula in both groups. P value ≤ 0.05 was considered as significant. All the results were presented as table and graphs.

RESULTS

In this study the distribution of age between two procedures was analyzed as in Snodgrass technique, 24(68%) patients were in the range of 2-6 years and 11(32%) patients were in the range of 7-10 years. Mean age was 6 years \pm 3.26. Where as in aivar bracka technique 23(65%) children were in age range 2-6 years and 12(35%) children were in age range 7-10 years. Mean age was 6 years \pm 3.41. (Table 1)

Duration of surgery among two procedures was analyzed as in Snodgrass technique, 14(40%) children had duration of surgery ≤ 60 minutes and 21(60%) children had duration of surgery >60 minutes. Mean duration of surgery was 72 minutes \pm 7.71. In Aivar bracka procedure 15(42%) patients had duration of surgery ≤ 60 minutes and 20(58%) children had duration of surgery >60 minutes. Mean duration of surgery was 72 minutes \pm 7.89. (lied in which P value was 1.000

Table 2)

Frequency of urethrocutaneous fistula in among two procedures was analyzed as in Snodgrass technique, urethrocutaneous fistula was found in 3(9%) patients and 32(91%) were all right. while 6(18%) patients developed urethrocutaneous fistula in Aivar Bracka technique and 29(82%) patients were normal. (Table 3)

Stratification of urethrocutaneous fistula with age and duration of surgery is given in Table 4 and Table 5

Table 1: AGE DISTRIBUTION (n=70)

AGE	SNODGROSS (GROUP A)	AIVER BRACKA (GROUP B)
2-6 year	24(68%)	23(65%)
7-10 year	11(32%)	12(35%)
Total	35(100%)	35(100%)
Mean and SD	6 years \pm 3.26	6 years \pm 3.41

Student T test was applied in which P value was 1.000

Table 2: DURATION OF SURGERY (n=70)

DURATION	SNODGROSS (GROUP A)	AIVER BRACKA (GROUP B)
≤ 60 minutes	14(40%)	15(42%)
>60 minutes	21(60%)	20(58%)
Total	35(100%)	35(100%)

Mean and SD	72 minutes \pm 7.71	75 minutes \pm 7.89
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Student T test was applied in which P value was 0.1123

Table 3: URETHROCUTANEOUS FISTULA (n=70)

URETHROCUTANEOUS FISTULA	SNODGROSS (GROUP A)	AIVER BRACKA (GROUP B)
Yes	3(9%)	6(18%)
No	32(91%)	29(82%)
Total	35(100%)	35(100%)

Chi Square test was applied in which P value was 0.2840

Table 4: STRATIFICATION OF URETHROCUTANEOUS FISTULA W.R.T AGE DISTRIBUTION (n=70)

AGE	URETHRO CUTANEOUS FISTULA	SNODGROSS (GROUP A)	AIVER BRACKA (GROUP B)	*P values
2-6 year	Yes	2	4	0.3522
	No	22	19	
Total		24	23	
7-10 year	Yes	1	2	0.5899
	No	10	10	
Total		11	12	

*P value was determined by Chi Square test

Table 5: STRATIFICATION OF URETHROCUTANEOUS FISTULA W.R.T DURATION OF SURGERY (n=70)

Duration	URETHRO CUTANEOUS FISTULA	SNODGROSS (GROUP A)	AIVER BRACKA (GROUP B)	*P values
\leq 60 minutes	Yes	1	2	0.5843
	No	13	13	
Total		14	15	
>60 minutes	Yes	2	4	0.3427
	No	19	16	
Total		21	20	

*P value was determined by Chi Square test

DISCUSSION

The Aivar bracka surgical technique has brought a revolution in the hypospadias repair surgery." In 2000, Rickwood AM (8) published his result of 367 cases". He proposes that Aivar Bracka repair forms "hairless urethra with wide caliber, vertical slit external meatus and excellent glanuloplasty". Along with the excellent results, the Aivar Bracka surgical technique was "straightforward, easy to reproduce and reliable".

Most of the Surgeons perform Aivar Bracka surgical technique for hypospadias correction in KP (88%), followed by Snodgrass (43%) or MAGPI (43%). Aslam, (9) in a 10-year review, he highlights the following advantages of the Aivar Bracka surgical technique like all types of hypospadias can be corrected with this technique. He also shows that vertical "slit external meatus can be achieved, with correction of all kind of chordee (unlike MAGPI), also scarless ventral surface and its universal application". And he recommends surgeons to master only this technique.

The Aivar Bracka technique is more popular because it is technically simple, versatile and having good cosmetic results. It can be used for correction of all types of hypospadias. Even for a trainee plastic surgeon, dealing with hypospadias it is easy to practice it and master this one procedure, he can treat all kind of hypospadias with this procedure (10).

Hypospadias surgery is having many complications even if performed by experienced surgeons (11). The severity of deformity plays key role in developing complications. The following are the most common complications of post hypospadias correction surgeries for example "urethrocutaneous fistula, urethral stricture, meatal stenosis, ventral chordee and painful erection" (12).

In our study, for Snodgrass hypospadias repair procedure, the mean age was 6 years \pm 3.26 while for Aivar Bracka surgical procedure the mean age was 6 years \pm 3.41. the frequency of urethrocutaneous fistula was 9% (n=3) in Snodgrass surgical technique, where as 18% (n=6) in Aivar Bracka Surgical Technique. The frequency of urethrocutaneous fistula was significantly low in group A (p=0.2840).

The similar frequency of urethrocutaneous fistula was found in other studies such as 23% (13) in Aivar Bracka repair and 7.2% (14) in Snodgrass technique. The results were

observed in different studies, there is no comparative study on the same population.

A study done by Irfanullah et al (9) shows the same results, and the complication of urethrocutaneous fistula occurs in any surgical procedure. Our study shows the 17.3%. of overall fistula rate after six months of follow-up. Similar results were observed in Bracka et al. (10) study showing the incidence of urethrocutaneous fistula 19%. Whereas According to Uzaor M et al (15) post Snodgrass repair urethrocutaneous fistula frequency was ranging 0.58%-16%. Cook AE et al (11) noted 12.5% urethro-cutaneous fistula rate. Uzaor M et al (15) reported post Snodgrass repair fistula rate of 11.8%16. David WT (8) noted a fistula rate of 2%, while Javanthi VR (16) reported a fistula of 1%.

In few patients we observed spontaneous healing of fistula just with finger occlusion method, fistula formation occurs from the start of wound healing, an abnormal communication forms between urthral mucosa and skin ,with the passage of time the fistula may heal without the need for any intervention.in our study we observed the same healing which supports this evidence (17).

In 2003, Cheng EY (11) used dartos flap fascia to cover the urethra with additional flap to minimize the complications. In 2006, Richard WT (18) also used bucks fascia as a vascularized flap to cover the neourethra and provide vascular support for the repair ,he obtained it from the shaft of the phallus, to decrease the complication of fistula formation. According to our study, urethrocutaneous fistula occurred in 3 (9%) patients and according to various other studies, the frequency of fistula is 0.58% to 16% (12, 19) in Snodgrass repair.

This higher incidence of urethrocutaneous fistula post Snodgrass repair observed in present study compare to several western studies may be because of the following factors "development of sub-specialties e.g pediatric urology, pediatric plastic surgery and dedication of surgical specialists to special field of interest in Western countries (20). Moreover sterilization techniques, sterilized operation theatre environment, proper suture materials and proper instruments may have an important role in decreasing the complications, over our study where we lack in our setup because of poor funding and dealing

with heavy elective surgical lists along with heavy casualties in this warzone. (21, 22)

CONCLUSION

Our study concludes that the complication of urethrocutaneous fistula is less frequent in Snodgrass surgical technique as compare to Aivar Bracka surgical technique in the treatment of distal penile hypospadias

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